

100 points total. Answer each question in the space provided, using the back of the sheet if necessary.

1. (10 pts.) Briefly explain the facts of *Boomer v. Atlantic Cement Co.*, and then explain the novel solution crafted by the judge.

10.  
Atlantic Cement, operating near a residential neighborhood, created negative externalities for those living in said residential neighborhood. The residents sued the Cement Company for the creation of said externalities which were nuisance & lowered their property values. Atlantic Cement was a large company & employed many people, and much money had been invested in the plant. The shutdown of the plant would have had severe negative economic consequences ranging in the several million dollar range whereas the damages suffered by the residents were only assessed to be about \$185,000. The judge found in favor of the residents, stating that Atlantic Cement Co. was in fact infringing upon them in its creation of externalities. Typically in such a case, the judge would issue an injunction rather than damages, as the two parties could cooperate easily enough. However, due to the large cost to Atlantic Cement Co. of closing down the plant & the economic impact of job loss, the judge issued an injunction against Atlantic Cement unless they chose to pay the \$185,000 damages. This allowed the residents compensation for the nuisance, but also saved Atlantic Cement Co. a lot of money & effort and was an efficient decision on the part of the judge.

good answer

100 points total. Answer each question in the space provided, using the back of the sheet if necessary.

1. (10 pts.) Briefly explain the facts of *Boomer v. Atlantic Cement Co.*, and then explain the novel solution crafted by the judge.

Atlantic Cement Co. was a newly constructed company in New York which provided over 300 jobs and was a multimillion dollar investment to the area. Boomer was a part of the community near the cement site and was affected by the constant shaking in his home as a result of the cement company.

Boomer et al sued the construction company saying that their production of cement was a nuisance which degraded their property values.

Prior to this case judges ruled in nuisance law as either awarding an injunction to stop the side producing a nuisance or siding with the nuisance and telling the other side they were out of luck.

When looking at the facts of this case the judge noted that the nuisance was causing property damage in a collective amount of around \$180,000 while an injunction against the cement co. would result in a multimillion dollar investment loss and a loss of jobs. Instead, the judge decided to issue the indictment against the company unless the plaintiffs/community was compensated for their loss of property value. This is a historic case because it allowed companies to compensate affected individuals for loss of property instead of being forced to shut down.

Atlantic Cement Co. had to pay the neighbors the \$180,000 dollars for the loss of property value.

good answer

100 points total. Answer each question in the space provided, using the back of the sheet if necessary.

1. (10 pts.) Briefly explain the facts of *Boomer v. Atlantic Cement Co.*, and then explain the novel solution crafted by the judge.

10

In *Boomer vs Atlantic Cement*, Boomer filed suit for damages as a result of the pollution, noise, and heavy vibrations caused by the nearby cement plant. While the judge ruled in favor of Boomer, the remedy for the situation required special consideration due to the large amount of money invested in the plant as well as the hundreds of jobs the plant created in the area. Consequently, the judge granted an injunction, closing the plant down, but offered to hold the injunction provided Boomer and the other citizens impacted by the plant's pollution were given compensatory monetary damages of \$185,000 by the plant. This is what the judge believed would make the plaintiff whole while still keeping the cement plant in business.

good.

2. (10 pts.) Establishing and enforcing a system of trademarks and trade names is costly to society because it uses scarce resources. Briefly explain the benefits that might make it worthwhile.

The benefits of trademarks & trade names are they

- ✓ reduce the research cost to consumers when they are looking to purchase a good or service. Instead of having to do lots of costly research, if they know the trademark or trade name they can easily find & purchase what they want. Which is the most economic allocation of resources. Another benefit is it promotes higher quality or lower-cost goods. The trademark & trade name of apple is associated w/ higher quality phones, computers, tablets, etc. Consumers expect that from them now so if their quality were to decline then they would lose their consumers.
- ✓ The same goes for a store like Wal-Mart that consumers associate w/ low-cost. If they raise their prices in an attempt to earn more profits then lower income families will refuse to shop there & go elsewhere in which case Wal-Mart would lose ~~the~~ money.

good answer

2. (10 pts.) Establishing and enforcing a system of trademarks and trade names is costly to society because it uses scarce resources. Briefly explain the benefits that might make it worthwhile.

10

One of the main benefits is that it lowers the search costs for consumers. If a consumer is looking for a product with certain qualities, trademarks ensure a consumer of the qualities within. For example, I am very tall and finding jeans that are the appropriate length can be tricky. I know that Arizona jeans have a "tall" sizing that meets my needs. It reduces my search cost because ✓ I don't need to try on several brands of jeans to find ones that are the appropriate length. I will purchase Arizona Jeans instead, which keeps my search costs low as I know they possess the qualities I desire.

Another benefit is it clears confusion when you're unsure of the quality of a product. ✓ For example, I went to Canada this summer to visit my family. While there, I purchased Blue Diamond almonds. I was unsure of the local brand's quality, so I looked for a brand that I knew I would enjoy.

Finally, trade marks are beneficial because they prevent copy cat companies. For example, if I wanted to sell pop that said "Coke" on it with the Coca Cola logo, I wouldn't be able to because it's under trademark. This would prevent me from attempting to "piggyback" of Coca Cola's reputation, and I wouldn't be able to sell a product of unknown quality under their name.

good answer

2. (10 pts.) Establishing and enforcing a system of trademarks and trade names is costly to society because it uses scarce resources. Briefly explain the benefits that might make it worthwhile.

10

There are several benefits of enforcing trademarks & tradenames to society. The first is that consumers can be protected & feel secure about buying a quality product. For example, when someone buys a Rolex watch they know it will keep good time and not break or fall apart within a week. Another benefit is that if companies know their name will be protected and can be a household name, they will be incentivized to produce more better quality products to compete against other companies. This competition will help stabilize prices for consumers. If global trademarks / tradenames are enforced then companies will not be worried about their name being used for bad products and will be more willing to expand to other countries.

good answer

2. (10 pts.) Establishing and enforcing a system of trademarks and trade names is costly to society because it uses scarce resources. Briefly explain the benefits that might make it worthwhile.

10

Trademarks benefits consumers and producers alike. For consumers, it gives them confidence and information ✓ about the quality of the product they are purchasing. Information can be difficult & expensive to obtain, so trademarks work to lower transaction costs for the buyer. For producers, it gives them the comfort that competitors will not attempt to immitate or fake their product. This incentivises them to continue producing their product. ✓

good answer

2. (10 pts.) Establishing and enforcing a system of trademarks and trade names is costly to society because it uses scarce resources. Briefly explain the benefits that might make it worthwhile.

- 10
- Benefits of trademarks include Higher consumer confidence & Higher quality. Brands are incentivized to provide High quality products that consumers can trust. By doing so, this helps consumers feel confident in their purchases while also knowing they are getting a safe product. This also reduces search costs which encourages efficiency. Without trademarks, people would buy generic products, with no idea to the quality of them. This would be a misallocation of resources as well as a lot of wasted food that people would refuse to eat. Trademarks also help producers communicate through advertisement. Trademarks also protect producers from impostors trying to rip them off.

good answer



3. (10 pts.) What three basic economic questions must every economic system answer? Briefly explain how a market system of economic organization answers each of these three questions.

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- ✓ what is going to be produced?
- ✓ How is it going to be produced?
- who is going to receive the goods/services?

✓ The market economy determines what is going to be produced based on demand by consumers. If consumers are willing to pay more for a product than it costs to produce the product, then that product will be produced.

✓ The market drives efficiency in production. Products will be produced in the lowest cost way to achieve a certain level of quality. Producers produce until the marginal cost = marginal benefit (the price of a unit of the good). Also,  $MRTS_{L,K}^A = MRTS_{L,K}^B$  in an efficient economy.

✓ who determines the products is determined by who can pay for the product. If a person values a product more than the price of the product and has the money, then the transaction will occur. A willing exchange in this case makes both parties better off.

Overall efficiency in the market economy occurs when

good answer

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3. (10 pts.) What three basic economic questions must every economic system answer? Briefly explain how a market system of economic organization answers each of these three questions.

① What to produce?

✓ \* This is determined by the invisible hand and the laws of supply and demand. If more consumers demand a certain product, more of that product will be produced (usually).

② How to produce it?

✓ \* Firms will find an optimal allocation of capital and labor that leads to profit maximization. (Efficiency in production)

③ Who gets it?

✓ \* Govts usually decide the answer to this question in a command economy, but in a pure market economy, products will go to consumers who are willing to pay the most. Most economies are a mix of the two, leaning towards market.

good answer

3. (10 pts.) What three basic economic questions must every economic system answer? Briefly explain how a market system of economic organization answers each of these three questions.

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What should be produced? How should it be produced? To whom should it be sold to? A market system answers these questions with the ideas of supply and demand and how it establishes prices. The market decides what should be produced by demand. If a firm comes up with a product that people love (demand will grow) and the firm will continue making the product. Same for a product they hate, if firms are free to make or not make products if a product isn't selling because the market (consumers don't want/like it) firms will not make that product thus a market chooses what products are to be produced. The 2nd question how it is produced, the market answers this by firms' idea of supply. Firms will choose a way to supply their product that is best for them to make a profit. For example, people want pay 20.00 for a pencil so firms need to find suppliers to lower cost so they can charge a price that they can make a profit. The 3rd question who should a product be sold to. This is also answered by the market through supply and demand. The market is set with prices decided by the market for supply and demand for a product. Consumers choose what to buy based on prices created by supply and demand. If a product is too expensive a consumer can choose not to buy it, thus markets answer the question on who products are sold to. Because markets allow consumers to choose their consumption bundles which affect prices, which affect other consumers.

3. (10 pts.) What three basic economic questions must every economic system answer? Briefly explain how a market system of economic organization answers each of these three questions.

① What to produce? How much to produce?

② How to produce?

③ For whom to produce?

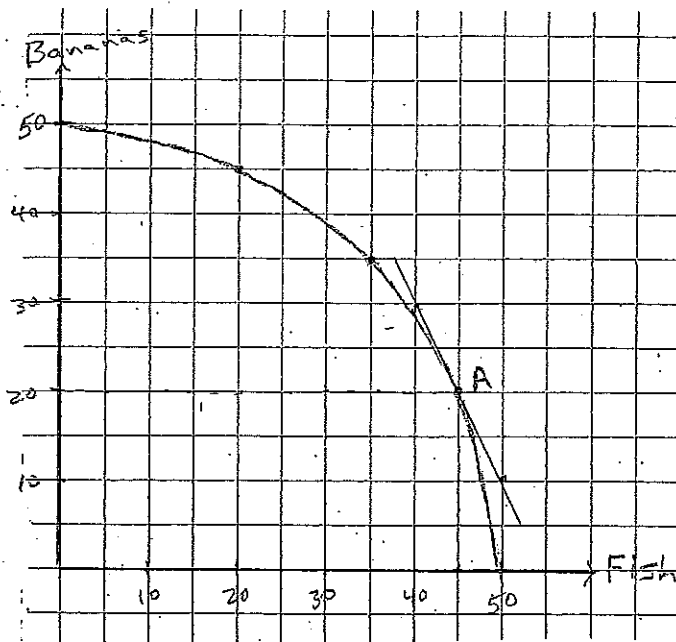
① A market system of economic organization allocates resource in the market by direct of the price in the market. The price is decided by the supply and demand level in the market. When demand of something increases, the price of that production increase. The company what to produce that product and the amount of that production depends on shortage of the production or early amount that consumers want, for example, last year's total sale of bilce.

② The economic organization allocates input resource such as labor, capital to produce the production. It also need company cooperation and efficiency technology to produce production so it can lower the cost. Economic organization will keep produce one production until the marginal cost equals to the marginal benefit.

③ As economic organization wants to maximize its profit. It produces the product for the person who not just want to buy that production but the person who value the production most to get the most profit.

4. (20 pts.) Abigail and Ann are stranded on an island. They are identical twins, and as such have identical tastes. After some initial bickering, they decide to split everything equally until they are rescued, guaranteeing that they will have identical marginal rates of substitution. They produce and consume two goods, bananas (B) and fish (F). They pick bananas from the trees on the island, and they catch fish in the lagoons on the island. They use only their own labor in the production process, so they don't have to worry about the marginal rate of technical substitution between labor and capital. Their weekly production possibilities frontier is illustrated below. They are currently producing combination A, with weekly production of bananas equal to 20 and weekly production of fish equal to 45. While efficiency in consumption is not an issue, they do have to worry about the other two aspects of efficiency. In fact, they often sit around the campfire at night and talk about Pareto optimality. At their current individual rates of consumption (B=10 and F=22.5), they agree that they would be willing to give up two fish to get an additional banana. Their marginal rate of transformation is illustrated in the diagram. They haven't been able to decide whether their situation is Pareto optimal or not. Fortunately they didn't lose their cell phones when their boat wrecked, so they text you for advice. Is this a Pareto optimal allocation of resources? Explain why or why not. If not, then go through a simple example to explain how they can increase their well-being.

20



$$2F : 1B$$

The marginal rate of transformation is  $\sqrt{2}$  Bananas for 1 fish. The MRT is equivalent to the slope of the tangent line of the PPF at point A. In a Pareto optimal situation, the marginal rate of substitution would equal the marginal rate of transformation. In this above case, the two values are not equal, so the situation is not Pareto efficient.

$$\text{MRS currently} = 2F : 1B$$

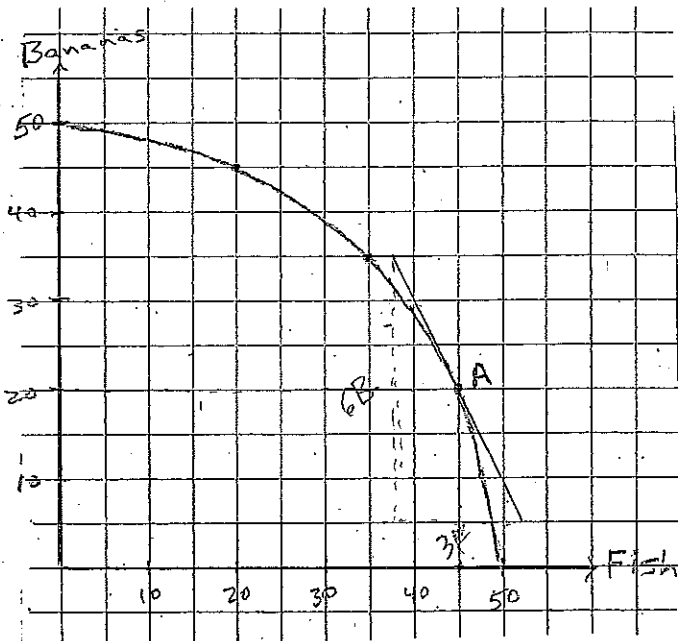
$$\text{MRT currently} = 3B : 1F$$

Because the situation is not Pareto optimal, then we could make at least one person better off without making any party worse off. Below is a simple example to explain how this could be done. The twins could use their resources to pick 2 more bananas rather than catch one more fish. At their current MRS, these 2 bananas would be valued the same as 4 fish. Instead of using their labor to gain one fish, they have now used their labor to gain the same value as 4 fish. The value of 3 fish has been created by their production choices. To achieve efficiency, more bananas should be picked relative to fish caught until  $\text{MRS} = \text{MRT}$ .

good answer!

4. (20 pts.) Abigail and Ann are stranded on an island. They are identical twins, and as such have identical tastes. After some initial bickering, they decide to split everything equally until they are rescued, guaranteeing that they will have identical marginal rates of substitution. They produce and consume two goods, bananas (B) and fish (F). They pick bananas from the trees on the island, and they catch fish in the lagoons on the island. They use only their own labor in the production process, so they don't have to worry about the marginal rate of technical substitution between labor and capital. Their weekly production possibilities frontier is illustrated below. They are currently producing combination A, with weekly production of bananas equal to 20 and weekly production of fish equal to 45. While efficiency in consumption is not an issue, they do have to worry about the other two aspects of efficiency. In fact, they often sit around the campfire at night and talk about Pareto optimality. At their current individual rates of consumption (B=10 and F=22.5), they agree that they would be willing to give up two fish to get an additional banana. Their marginal rate of transformation is illustrated in the diagram. They haven't been able to decide whether their situation is Pareto optimal or not. Fortunately they didn't lose their cell phones when their boat wrecked, so they text you for advice. Is this a Pareto optimal allocation of resources? Explain why or why not. If not, then go through a simple example to explain how they can increase their well-being.

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At A = 20 bananas, 45 fish.

$$MRS: 2F:1B$$

$$MRT: 3F:6B \text{ or } 1F:\overset{2}{3}B$$

Since they would trade two fish for one banana, their  $MRS_{F,B} = 2F:1B$ .

According to the diagram, their  $MRT_{F,B} = 1F:\overset{2}{3}B$ .

This isn't Pareto optimal because it doesn't satisfy the overall efficiency condition that  $MRS_{F,B} = MRT_{F,B}$ .

For something to be Pareto optimal, a change can't make someone better off without making another worse off.

A Pareto improvement is when a change will make one better off without making another worse off.

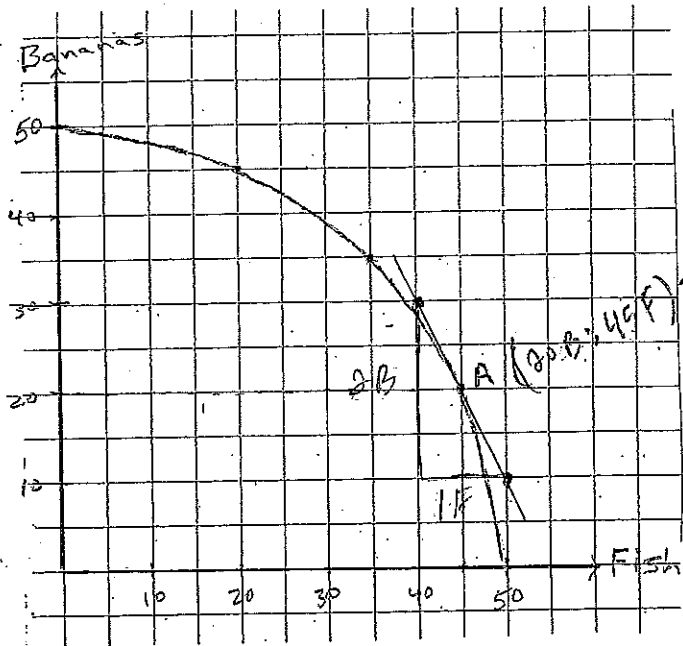
Both girls are willing to give up two fish to get one banana. This would indicate that bananas are worth more to them than fish. Since they can catch one less fish to get three more bananas, as defined in their MRT, they would be better off doing so; they will have more bananas.

They should continue to do this until their  $MRS = MRT$  and they achieve Pareto optimality.

good answer

4. (20 pts.) Abigail and Ann are stranded on an island. They are identical twins, and as such have identical tastes. After some initial bickering, they decide to split everything equally until they are rescued, guaranteeing that they will have identical marginal rates of substitution. They produce and consume two goods, bananas (B) and fish (F). They pick bananas from the trees on the island, and they catch fish in the lagoons on the island. They use only their own labor in the production process, so they don't have to worry about the marginal rate of technical substitution between labor and capital. Their weekly production possibilities frontier is illustrated below. They are currently producing combination A, with weekly production of bananas equal to 20 and weekly production of fish equal to 45. While efficiency in consumption is not an issue, they do have to worry about the other two aspects of efficiency. In fact, they often sit around the campfire at night and talk about Pareto optimality. At their current individual rates of consumption (B=10 and F=22.5), they agree that they would be willing to give up two fish to get an additional banana. Their marginal rate of transformation is illustrated in the diagram. They haven't been able to decide whether their situation is Pareto optimal or not. Fortunately they didn't lose their cell phones when their boat wrecked, so they text you for advice. Is this a Pareto optimal allocation of resources? Explain why or why not. If not, then go through a simple example to explain how they can increase their well-being.

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$$MRS_{B,F} (Abi) = MRS_{B,F} (Ann) = 1B : 2F = \frac{1}{2}$$

$$MRT_{B,F} = 2B : 1F = 2$$

$$4B : 2F = 2$$

★ This is NOT a Pareto optimal allocation of resources, because  $MRT_{B,F} > MRS_{B,F}$ .

In this instance, a Pareto improvement exists by allocating resources away from the production of Fish and towards the production of Bananas until  $MRT_{B,F} = MRS_{B,F} = 1B : 2F$ .

good answer

5. (20 pts.) Defining and enforcing ownership rights to natural gas has its challenges, since natural gas exists in underground rock formations that often extend over long distances, lying below the surface property of many different landowners. There are two general principles for establishing ownership rights to fugitive property such as foxes and natural gas. What are they? Discuss the advantages and disadvantages of each in establishing who owns the gas.

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① Right of 1<sup>st</sup> possession :

✓ (+) This is easy to administer b/c whoever has it first, is ~~is~~ who it belongs to.

(-) BUT, this leads to an inefficient use of resources b/c it gives incentive for individuals to use as much as possible, as quickly as possible. (ex. Milkshake split b/w two people) (Tragedy of the Commons)

② Tied Ownership :

✓ (+) This can lead to an efficient use of resources b/c the parties that own this resource will be able to extract it at an agreed upon sustainable rate.

(-) This is costly to administer b/c certain guidelines have to be set for who can use it and when they can use it.

good answer!



5. (20 pts.) Defining and enforcing ownership rights to natural gas has its challenges, since natural gas exists in underground rock formations that often extend over long distances, lying below the surface property of many different landowners. There are two general principles for establishing ownership rights to fugitive property such as foxes and natural gas. What are they? Discuss the advantages and disadvantages of each in establishing who owns the gas.

20  
The two general principles for ownership of fugitive property is tied <sup>ownership</sup> possession and first possession.

First possession states that whoever first extracts the gas, owns it.

The advantage of this is that it cheaply and easily defines clear property rights, and it's easy to administrate/enforce. Whoever kills the fox owns the fox, clear and simple.

✓ The disadvantage to this is that it incentivizes people to draw the gas from the ground too quickly. In order to prevent anyone else from getting the gas, a person would try to get as much as quickly as they can. This isn't efficient, because more gas could potentially be had by extracting it at a sustainable rate (such as the straw/sponge example).

✓ Tied possession would state the gas belongs to the surface owner. The benefit to this is that it promotes people to take the gas at a sustainable rate. People would have no benefit to try to quickly take it, so they will get it more efficiently. This increases the value earned overall from the gas.

The problem with tied possession is that it's hard to administrate, and costly. For example, the gas underground would have to be split up by the amount of land the owner has. This would require learning the total amount of gas available, and then splitting it in proportion to the owner's land size. This would be hard and costly to do.

good answer!

- 20
5. (20 pts.) Defining and enforcing ownership rights to natural gas has its challenges, since natural gas exists in underground rock formations that often extend over long distances, lying below the surface property of many different landowners. There are two general principles for establishing ownership rights to fugitive property such as foxes and natural gas. What are they? Discuss the advantages and disadvantages of each in establishing who owns the gas.

The two principles are the right of first possession and tied ownership.

The right of first possession makes it easy to identify property rights. It is thus cheap to enforce. However, it results in scarce resources being overharvested. Scarce resources like natural gas will be extracted at a rate beyond the maximum sustainable yield. People will preemptively use resources / obtain resources so that other people don't have the chance. This, especially in the case of natural gas, is because owners gain from added scarcity value. Natural gas increases in value as there becomes less of it. The costs, however, are not fully internalized.

With the right of 1<sup>st</sup> possession, many efforts are made to redistribute property rather than produce with it, and this is not efficient. Also beyond the maximum sustainable yield, the marginal benefit is negative. By employing fewer resources, we could actually benefit (as in the oyster case). This is clearly not an efficient situation.

Tied ownership means that the natural gas is tied to ownership of the surface land. It is more difficult and costly to determine property rights using this principle than right of first possession. However, it curtails the incentive to extract natural gas and other resources beyond their maximum sustainable yield.

To clarify, right of first possession implies that the person who extracts the natural gas first / kills and captures the fox first owns the natural gas / fox first. Earlier, I delved into explaining the advantages and disadvantages without describing the principle.

good answer!

5. (20 pts.) Defining and enforcing ownership rights to natural gas has its challenges, since natural gas exists in underground rock formations that often extend over long distances, lying below the surface property of many different landowners. There are two general principles for establishing ownership rights to fugitive property such as foxes and natural gas. What are they? Discuss the advantages and disadvantages of each in establishing who owns the gas.

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Two general principles:

1) Right of First Possession: can claim fugitive property upon point of extraction only.

- Advantage: lower administrative/enforcement costs

- Disadvantage: overuse (Tragedy of the Commons)

2) Tied-Ownership: owner of land/property gets ownership of any subterranean resources located under surface property.

- Advantage: Efficient pace of extraction due to clearly-defined property rights.

- Disadvantage: High administrative/enforcement costs, and difficult to calculate who gets how much of the resource.

good answer!

6. (30 pts.) The E Electric Company emits smoke, which dirties the wash at the L Laundry. No one else is affected because E and L are located near to each other but far from anyone else. E can abate this nuisance by installing scrubbers on its smokestacks. L can eliminate the damage by installing filters on its ventilation system. The installation of scrubbers by E (at a cost of \$500) or filters by L (at a cost of \$100) completely eliminates the pollution problem. The presence of pollution (i.e. no scrubber and no filters) reduces L's profits from \$300 to \$100. The following table shows the profits of each company depending on what action is taken:

		Laundry	
		no filter	filter
Electric Company	<u>no scrubbers</u>	L: \$100 E: \$1000	L: \$200 E: \$1000
	<u>scrubbers</u>	L: \$300 E: \$500	L: \$200 E: \$500

*Handwritten notes:*  
 - Above the table: Profits  
 - Next to L: \$100, E: \$1000:  $\$1100$  profit  
 - Next to L: \$200, E: \$1000:  $\$1200$  profit  
 - Next to L: \$300, E: \$500:  $\$800$  profit  
 - Next to L: \$200, E: \$500:  $\$700$  profit

- a) Suppose that you own both companies. What course of action would you take? Is your decision efficient or is there an externality here that makes your decision inefficient?

10 If I owned both companies, I would install filters at L. This decision is efficient because it will yield the greatest total profits for both companies combined. This solution employs the cheapest means of internalizing the externality (i.e. \$100 filters v. ~~\$500~~ scrubbers), thus providing the most profits.

- b) Suppose that the companies are independently owned, and the laundry sues the electric company for the nuisance they have created. The court decides in favor of the electric company. What is the likely outcome and will it be efficient?

10 The likely outcome is that the laundry will install the filters. Since the court decided for the electric company, E is unlikely to do anything to abate the solution. As such, L will still have an increase in profits of \$100 by installing the filters. Incidentally, this is the most economically efficient option for this particular scenario as it creates the most overall profit.

- c) Suppose instead that the court decides in favor of the laundry, and grants an injunction forbidding E from polluting. What is the likely outcome and will it be efficient?

10 If E and L have low or zero transaction costs, they will most likely form an agreement to remedy the situation. E will most likely pay L to install the filters, thus allowing E to still generate profits while eliminating the nuisance to L. This will be efficient as lessened profits for E still produces greater overall profits than if E stopped operating altogether.

If E and L have high transaction costs, however, they might not collaborate. This would create an inefficient solution in which E would produce no profits, limiting the overall profits to \$200 from L.

6. (30 pts.) The E Electric Company emits smoke, which dirties the wash at the L Laundry. No one else is affected because E and L are located near to each other but far from anyone else. E can abate this nuisance by installing scrubbers on its smokestacks. L can eliminate the damage by installing filters on its ventilation system. The installation of scrubbers by E (at a cost of \$500) or filters by L (at a cost of \$100) completely eliminates the pollution problem. The presence of pollution (i.e. no scrubber and no filters) reduces L's profits from \$300 to \$100. The following table shows the profits of each company depending on what action is taken:

		Laundry	
		<u>no filter</u>	<u>filter</u>
Electric Company	<u>no scrubbers</u>	L: \$100 = \$1100 E: \$1000	L: \$200 = \$1200 E: \$1000
	<u>scrubbers</u>	L: \$300 = \$800 E: \$500	L: \$200 = \$700 E: \$500

- 10 a) Suppose that you own both companies. What course of action would you take? Is your decision efficient or is there an externality here that makes your decision inefficient?

✓ I would install filters for L Laundry's ventilation system without installing scrubbers. This would maximize my profits as \$1200 is the highest when L and E are added. Because the companies are far away from anyone else, it is assumed that there is no external cost from the smoke emitted by E. Therefore, I am not making anyone worse off from the pollution and this is efficient.

- b) Suppose that the companies are independently owned, and the laundry sues the electric company for the nuisance they have created. The court decides in favor of the electric company. What is the likely outcome and will it be efficient?

1° The electric company will continue to not use scrubbers as scrubbers reduce profits by \$500. L Laundry will not be able to pay E a sufficient amount to incentivize E into buying scrubbers, so L will buy filters, because with filters L makes \$200 compared to \$100 without. ✓

Again, assuming no externalities to the public as in part (A), this outcome will be efficient.

- 1° c) Suppose instead that the court decides in favor of the laundry, and grants an injunction forbidding E from polluting. What is the likely outcome and will it be efficient?

To avoid the \$500 dollar loss in profit, E will likely try to pay L to install filters. Since L will make \$300 without filters (as E will have to install scrubbers) and makes \$200 with filters, E will need to pay L at least \$100 to make up for lost profit due to the filters. E is happy to do this because \$100 is much less than a \$500 hit to profits. ✓

This is the most efficient outcome. If E pays L for the filters, let's say \$150,  $L = \$350$ ,  $E = \$850$ .  $E + L = \$1200$ , which is our optimal outcome.

good.

6. (30 pts.) The E Electric Company emits smoke, which dirties the wash at the L Laundry. No one else is affected because E and L are located near to each other but far from anyone else. E can abate this nuisance by installing scrubbers on its smokestacks. L can eliminate the damage by installing filters on its ventilation system. The installation of scrubbers by E (at a cost of \$500) or filters by L (at a cost of \$100) completely eliminates the pollution problem. The presence of pollution (i.e. no scrubber and no filters) reduces L's profits from \$300 to \$100. The following table shows the profits of each company depending on what action is taken:

		Laundry	
		<u>no filter</u>	<u>filter</u>
Electric Company	<u>no scrubbers</u>	L: \$100 E: \$1000	L: \$200 E: \$1000
	<u>scrubbers</u>	L: \$300 E: \$500	L: \$200 E: \$500

- a) Suppose that you own both companies. What course of action would you take? Is your decision efficient or is there an externality here that makes your decision inefficient?

10 I would install a filter on the Laundry's ventilation system, which would result in the highest level of efficiency: \$1200.

✓ This is an efficient outcome because the Laundry is the low-cost mover.



- b) Suppose that the companies are independently owned, and the laundry sues the electric company for the nuisance they have created. The court decides in favor of the electric company. What is the likely outcome and will it be efficient?

In this case, the laundry company would be most likely to install the filters, which would only cost them \$100, keeping them profitable. This is an efficient outcome due to Coas Theorem.

- c) Suppose instead that the court decides in favor of the laundry, and grants an injunction forbidding E from polluting. What is the likely outcome and will it be efficient?

In this case, rather than pay \$500 to install scrubbers, the electric company is more likely to reach a settlement with the laundry company to pay them \$150 (or some amount over +50 \$100) to install the filter. The electric company makes \$850, the laundry company makes \$350, and we once again have an efficient outcome.

Every scenario, given clear property rights + zero transaction costs, comes to the same efficient amount: \$1200.  
good.